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THE EFFECTS OF SMART BOARD APPLICATIONS ON STUDENTS' ATTITUDES IN PATTERN-MAKING TEACHING

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Abstract

The aim of this study is to determine the effects of Synchronous E-learning Applications and Face-to-face Teaching based on Smart Board on students' attitudes in Pattern-Making Teaching which is one of the fundamental courses in fashion design and clothing education. Hence, this paper seeks to answer the question "Do Synchronous E-learning Applications and Face-to-face Teaching based on Smart Board affect students' attitudes in Pattern-Making Teaching?" In this study, a pretest - posttest control group design was used on 51 students. An attitude scale developed by the researchers was applied. In Pattern-Making teaching, the first Experiment group was taught through Face-to-face Teaching based on Smart Board, while the second Experiment group was taught through Synchronous E-learning based on Smart Board. The Control group was taught through Traditional Teaching methods. The Kruskal Wallis-H Test was applied to identify the difference between the groups. The Mann Whitney-U Test was performed for binary comparisons to test for significant differences according to test results. A significant correlation was found at 0.001 level in the results. Smart Board applications were observed to generate more positive attitudes in the experiment groups. It was found that the attitudes of the students in the Experiment-1 group where the smart board based Face-to-face Teaching was conducted were more positive than those in the Experiment-2 group in which E-learning Applications were conducted. As expected, no significant difference in attitudes of students were found in the Control group since the same teaching approach was used.

Keywords: Smartboard, e-learning, pattern-making, students' attitudes

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1. Introduction

In today's information age, the necessity of change in the field of education and teaching is increasing the importance of teaching technologies, especially computers (Kocasaraç, 2003). Information and communication technologies (ICT), defined as a collection of technologies that automatically collect, process, store and forward any information or access this information from multiple sources at any time (Malasri, 2000), are the most important driving force of rapid change in higher education (Uzay, ICT which are widely used in higher education institutions affect the shape and scope of education and teaching considerably (Turan & Çolakoğlu, 2008). Smart Boards, a new technology in interactive whiteboards, are thought to provide significant contributions to education (Adıgüzel et al., 2011).

Pattern-Making Teaching forms the basis of the courses aimed at training staff of the clothing industry by providing basic knowledge, skills and work habits related to the clothing field (Özer, 1989). The two-dimensional geometric form prepared on the paper (Çardak & Değirmenci, 2008) is called a pattern so that the garment to be produced will have the three-dimensional body form and the desired model characteristic. In pattern making, courses are usually taught through traditional methods. Traditional teaching methods however, tend to create passive students, causing rote learning, boredom, and the deterioration of the learning attitudes of students (Caner, 2008). New approaches in today's education system, alternative teaching methods and technological developments require changes in educational and teaching services. Within the field, in the courses on clothing education, the use of these new approaches and technologies in Pattern-Making courses which constitute the first step of clothing production (Avşar, 2006) has also become a necessity. Professional Pattern-Making teaching in the clothing sector requires intensive practice-based special training that would be possible by developing activities within the production chain in the textile manufacturing sector (Beduschi & Italiano, 2013).

Smart Boards are white interactive boards that display images on a computer monitor with surfaces working like a giant touch screen (Preston & Mowbrey, 2008). When used extensively, they work just like moderators to enhance interaction between students and teachers (Lewin et al., 2008). Smart Boards, which are easy to set up and use, are educational tools used extensively in Europe and America (Ekici, 2008). These Smart Boards accelerate the flow of information enabling teachers and learners to optimize their time. Smart Boards began to be used in the UK between 2003 - 2005. According to a study in 2007, Smart Boards were used in all primary schools and in 98 percent of secondary schools, which attracted the attention of other European countries (Yapıcı & Karakoyun, 2016). In Turkey, the Fatih Project has been developed as the largest and most comprehensive education movement

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implemented in the world. Through the use of technology in education, this project aims to provide each student with the best education possible, attain the highest education standards and provide equality of opportunity in education (Ministry of National Education, 2016). As a result of the rapid development in information technology, intelligent education is gradually changing the traditional educational and e-learning mix (Belskaya, Moldovanova et al, 2016). Smart Boards which are a new concept and which have developed greatly in the field of education technology in recent years are one of the effective solutions in distance education or e-learning (Ekici, 2008).

Electronic education is a distance education model in which electrical devices such as audio, visual devices and computers are used extensively in order to convey the course contents prepared by the instructor to the students who are physically in different places, to direct the students' questions to the instructor and to evaluate what is taught via exams (Özmen & Ediz, 2002). Especially in rural areas, there are schools where the quality of education is compromised due to inadequacy of teachers, lack of infrastructure causing the un-availability of certain courses. However, through technological applications, these courses can be provided via internet, by teachers or lecturers who are specialists in their fields and institutions in different, even remote regions can benefit from these opportunities. In these circumstances, distance learning can be used as a model to provide equal opportunity to all seeking an education. The application of this model in the field of vocational and technical education enables individuals to acquire skills and to increase the skills of employees within various vocational fields. In addition, it is possible that the developments and changes taking place in the field of vocational and technical education can be delivered to individuals simultaneously (Şahin, 2010). Vocational training is one of the areas where distance education can be successfully used (Erisen et al., 2012).

2. Problem Statement

The research is based on "How do different teaching approaches based on Smart Board affect the students' attitudes in teaching of Pattern-Making?"

3. Research Questions

The research questions are given below:

Do Smart Board-based face-to-face teachings affect students' attitudes in teaching Pattern-Making?

Do Smart Board-based synchronous E-learning applications affect students' attitudes in teaching Pattern-Making?

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4. Purpose of the Study

This research has been conducted in order to determine the effects of synchronous E-learning applications and face-to-face teaching using Smart Board on students' attitudes in teaching Pattern-Making. In the research, the answers to the following questions are sought in accordance with general purpose:

1. In teaching Pattern-Making, is there a meaningful difference on students' attitudes (post-test) between the two experiment groups and the control group?

2. In teaching of Pattern-Making, is there a meaningful difference in students' attitude achievements (pre-test / post-test) between the experiment groups and the control group?

5. Research Methods

This section includes the model of the research, study groups, development of data collection tools, how the data was collected and analyzed.

5.1. Research Model and Study Group

A pre-test / post-test control group design was used in this study. Pre-test / post-test designs are used to compare groups' results emerging from experimental procedures and/or measurement changes (Dimitrov & Rumrill, 2003). This real trial models are one of the most valuable scientific research models (Karasar, 2008). To fit the purpose of the research, the researchers created an instructional design based on the Smart Board. The aim of this design was to develop positive attitudes among students doing clothing courses. To prove that the Smart Board-based instructional design does affect the attitudes of the students, two different experiment groups were created to test the premise that Face-to-face Teaching and Synchronous E-learning Applications could result in varying attitudes among the students.

The present instructional design covers a total of 30 hours of practice, which lasts 5 weeks in the "Blouse & Dress Pattern-Making" course, and given 6 lessons per week. The subjects of this course which is taught in Ready-to-Wear Teaching Department of Vocational Education Faculty are as follows: taking measurements according to metric system, basic body form, dart shifts, preparing basic arm and regler arm form and rehearsing basic forms. The course is based on student centered full learning and active learning models. Course presentations prepared on smartboards were used in the classes. At the beginning of the classes, the important topics of the past week, which were recorded on the smart board, were repeated. Before starting the new topic, to draw students' attention, questions were asked and brain storming activity was carried out. The pattern drawings were made in stages on the smart board to facilitate the conception of the student. The presentation of the topics were reinforced by

the videos displayed on the smart board. In teaching theoretical subjects, question-and-answer techniques were used on the smart board to make the classes fun, and competitions were conducted. At the end of the course each week, the recorded lecture presentations on the smart board were given to the students. In this way, it was possible for students to reinforce what they have learned at home visually and aurally.

Instructional design had the same content and design in both experimental groups. The only difference in the Experiment-2 group where Synchronous E-learning Applications was applied was that students had to follow the course via internet without class. In the control group (TE) where traditional training was carried out, no different course material was used, the course was taught with a teacher-centered approach in which the learner was passive. The teacher taught the new subjects on a smart board and students drew their own patterns by themselves.

The study group comprised 51 students who were studying in the Vocational Education Department in Selcuk University in Konya. 18% of students were 18 years old, 41% were 19, 14% were 20, and 27% were older than 21. 84% of the students in study group came from vocational high schools. The students were taking a course titled in spring semester. They were separated into three groups randomly. The two groups were named Experiment-1 and Experiment-2, where the Smart Board-based instructional design was applied via Face-to-face Teaching in Experiment-1 (FFT) group while the same lecture material was applied via Synchronous E-learning Application in the Experiment-2 (SEA) group. In other words, the Smart Board-based course material used in both experiment groups was the same, only the teaching approach differed. The third group was assigned as the Control group for Traditional Education (TE) application without the use of the smart board.

The independent variables of the study are the different teaching practices in the Experimental-1 (FFT) and the Experiment-2 (SEA) groups of smartboard-based instructional design prepared by researchers for Pattern-Making teaching. The dependent variable, which is expected to be influenced by the transfer of students using Face-to-face Teaching and Synchronous E-learning Applications, is the attitudes of students towards Pattern-Making teaching.

The pre and post tests comprised the attitude scale developed by the researchers. Only one attitude scale was prepared and a single scale with the same content in was applied as the pre-test and post-test. A pre-test was conducted before the intervention in the form of the instructional design application commenced. According to the pre-test results, there was no meaningful difference at “α=0.05 significant level” between the three groups in terms of attitude scores to the different teaching approaches. In other words, prior to the experiment,

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both experiment groups and the control group were found equivalent in terms of their attitudes related to Pattern-Making.

5.2. Data Collection Tools and Development

An attitude scale was designed by the researchers was used to collect the data in this study. In the attitude scale used in the present study, there are seven sub-dimensions related to the teaching of pattern preparation towards determining student attitudes. The attitude expressions in the scale were determined by the researchers and were formed depending on expert opinions. The experts consist of 6 people serving as teaching staff at Selçuk University, one of which is as an education technology specialist, 2 program development specialists and 4 ready-to-wear specialists who have competence in pattern preparation. Initially, a scale of 50 items was administered to 122 students who were not part of the study group for validity reliability tests. As a result of the item analysis, 6 expressions with low discrimination were taken out and the final form was given to the scale. The scale consisting of 44 attitude expressions was prepared with a 5-point likert type response scale. The responses given to the attitude statements in the scale are rated from Totally agree – Agree – Undecided – Agree – Never Agree. The reliability of the prepared attitude scale was also examined by the internal consistency method. For this, the Cronbach Alpha coefficients for all scales and sub-dimensions were calculated separately.

The attitude scale prepared for teaching of Pattern-Making consists of seven sub-dimension that the questionnaire items are classified into. These sub-dimensions are as follows: 1) General attitudes related to Pattern-Making courses, 2) Attitudes related to the lecture strategies of Pattern-Making courses, 3) Attitudes related to the students' responsibility in the course, 4) Attitudes toward students' willingness against Pattern-Making courses, 5) Attitudes related to using tools and supplementary materials, 6) Attitudes regarding friendship relations between students, and 7) Attitudes regarding lecturer.

When the results were examined according to sub-attitude dimensions, it is seen that there are significant differences in all sub-dimensions. As a result of the factor analysis performed using SPSS 15 for the attitude scale, the reliability coefficient of the scale was calculated as 0.92. In addition, Cronbach's Alpha coefficients for all scales and sub-dimensions were calculated separately as a measure of the internal consistency of the items (similarity). An examination of the Cronbach's Alpha values of the sub-dimensions revealed that the highest Alpha value was 0.89 and the lowest value was 0.77. Hence, the Pattern-Making Teaching Attitude Scale was found to have sufficient reliability to be used in this study.

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The attitude scale used as pre-test and post-test was applied to al the students in the experimental groups and control group at the same time. The time given to students to complete the scale was 35 minutes.

5.3. Data Analysis and Interpretation

The data obtained from the study were analyzed using SPSS 15. To test the hypothesis as used below, Kruskal Wallis-H Test for triplet group comparisons, Mann Whitney-U Test for binary group comparisons and Wilcoxon Signed Rank Test for comparison of gain score averages were used to determine pre-test and post-test scores of the attitude scale of the control and the two experiment groups. These tests are widely used among nonparametric tests (Semiz et al, 2008). In thesis tests, the level of significance is accepted as α=0.05. The results obtained for this data analysis are presented in the tables that follow and interpreted in the accompanying discussions.

6. Findings and Discussion

This section presents the results and relevant interpretations based on the analysis of the post-tests.

6.1. The Effect of Students' Attitudes (post-test) on Face-to-face Teaching & Synchronous E-learning Applications Based on Smart Board in Teaching of Pattern-Making

The first sub-objective examined in the study is that the attitudes of the students in the control and experimental groups (post-test) on the teaching of Pattern-Making differ. Accordingly, it was expected that the attitudes of the students in the Experiment-1 group participating in the FFT (post-test) would be more positive than the Control group; the attitudes of the students in the Experiment-2 group participating in the SEA (post-test) would be more positive than the Control group and the attitudes of the students in the Experiment-1 group (post-test) would be more positive than the attitudes of the students in the Experiment-2 group (post-test). To test these three sub-hypotheses, the post-test was applied to all students after the intervention and the attitude scores were calculated.

The results of the Kruskal Wallis-H Test on the comparison of the attitude (post-test) scores of the students in the control and experiment groups in the Pattern-Making teaching are given in Table 1.

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Table 1. The results of the Kruskal-Wallis H-Test on the Comparison of the Attitudes of the Students in the Control and Experiment Groups in the Pattern-Making Teaching

Subscales of Attitudes	Post-test	N	Mean Rank	Sd	X^2	P	Acceptance
General attitudes related to PM courses	Experiment-1 (FFT)	17	40.03	5.249	24.253	0.000*	1-2
	Experiment-2 (SEA)	17	21.94				1-3
	Control (TE)	17	16.03				
Attitudes related to the lecture strategies of PM courses	Experiment-1 (FFT)	17	39.71	4.742	29.813	0.000*	1-2
	Experiment-2 (SEA)	17	26.29				1-3
	Control (TE)	17	12.00				2-3
Attitudes related to the students' responsibility in the PM course	Experiment-1 (FFT)	17	34.94	2.893	11.866	0.003*	1-3
	Experiment-2 (SEA)	17	25.44				
	Control (TE)	17	17.62				
Attitudes toward students' willingness against PM courses	Experiment-1 (FFT)	17	37.00	4.279	20.114	0.000*	1-2
	Experiment-2 (SEA)	17	26.76				1-3
	Control (TE)	17	14.24				2-3
Attitudes towards using tools and supplementary materials	Experiment-1 (FFT)	17	38.47	2.924	19.710	0.000*	1-2
	Experiment-2 (SEA)	17	22.76				1-3
	Control (TE)	17	16.76				
Attitudes regarding friendship relations between students	Experiment-1 (FFT)	17	35.53	1.931	11.332	0.003*	1-2
	Experiment-2 (SEA)	17	20.44				1-3
	Control (TE)	17	22.03				
Attitudes regarding lecturer	Experiment-1 (FFT)	17	37.94	2.441	23.644	0.000*	1-2
	Experiment-2 (SEA)	17	26.62				1-3
	Control (TE)	17	13.44				2-3
Overall Attitude Score	Experiment-1 (FFT)	17	41.47	18.396	36.728	0.000*	1-2
	Experiment-2 (SEA)	17	25.94				1-3
	Control (TE)	17	10.59				2-3

Table 1 shows that there are differences between the post-test scores of all groups in terms of all attitude dimensions. The Kruskal Wallis-H Test which was used to determine whether these differences are meaningful, found that the difference between the groups in overall attitude scores is significant at the level of α=0.001 (x^2=36.728). When evaluated in terms of sub-dimensions, the differences in all sub-dimensions were also found to be

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statistically significant. That is, there are significant differences between the attitude scores of each of the groups.

When the mean ranks of the control and experiment groups are examined, it was found that the attitude scores of the students in both experiment groups which were taught using different teaching approaches based on Smart Boards were more positive than the scores of the students in the Control group which was taught using traditional teaching methods.

The Mann Whitney-U Test was conducted to compare two independent groups in order to test the sub-hypothesis of "The attitudes of the students in Experiment-1 participating in the FFT (post-test) are more positive than the attitudes of the students in the Control group". The results are given in Table 2 as follows.

Table 2. The Results of Mann Whitney-U Test in Regard to Comparison of Attitudes (Post-test) of the Students in Experiment-1 Group and Control Group

Attitude Dimensions	Post-test	N	Mean Rank	Sum of Rank	U	P	Significance
General attitudes related to PM courses	Experiment-1 (FFT)	17	25.15	427.50	14.500	0.000	P<0.001*
	Control (TE)		9.85	167.50			
Attitudes related to the lecture strategies of PM courses	Experiment-1 (FFT)	17	25.24	429,00	13.000	0.000	P<0.001*
	Control (TE)		9.76	166.00			
Attitudes related to the students' responsibility in the PM course	Experiment-1 (FFT)	17	23.35	397.00	45.000	0.001	P<0.05*
	Control (TE)		11.65	198.00			
Attitudes toward students' willingness against PM courses	Experiment-1 (FFT)	17	24.38	414.50	27.500	0.000	P<0.001*
	Control (TE)		10.62	180.50			
Attitudes towards using tools and supplementary materials	Experiment-1 (FFT)	17	24.71	420.00	22.000	0.000	P<0.001*
	Control (TE)		10.29	175.00			
Attitudes regarding friendship relations between students	Experiment-1 (FFT)	17	21.88	372.00	70.000	0.009	P<0.05*
	Control (TE)		13.12	223.00			
Attitudes regarding lecturer	Experiment-1 (FFT)	17	24.18	411.00	31.000	0.000	P<0.001*
	Control (TE)		10.82	184.00			
Overall Attitude Score	Experiment-1 (FFT)	17	25.85	439.50	2.500	0.000	P<0.001*
	Control (TE)		9.15	155.50			

Table 2 reveals that there are differences between the post-test scores regarding the overall attitudes of the students in the Experiment-1 group and in the Control group. According to the results obtained from the Mann Whitney-U Test to determine whether these observed differences were meaningful, the difference between the groups was found to be at the level of α=0.001 in terms of overall attitude score. When examined according to sub-attitude dimensions, it can be seen that there are significant differences in all sub-dimensions. Significant differences were found at $p<0.05$ level in attitudes related to the students'

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responsibility in the PM course and attitudes regarding friendship relations between students at p <0.001 level in other sub-attitude dimensions.

This means that there is a significant difference between the attitudes of the Control group students and the students of the Experiment-1 group participating in the FFT regarding the teaching of Pattern-Making. When the Mean Rank values are examined, it is seen that this difference is due to the fact that the attitude scores of the students in the Experiment-1 (FFT) group are more positive than the scores of the students in the Control (TE) group.

The Mann Whitney-U Test was conducted to compare two independent groups in order to test the sub-hypothesis of "The attitudes of the students in Experiment-1 group participating in the SEA (post-test) are more positive than the attitudes of the students in the Control group". The results are given in Table 3.

Table 3. Results of Mann Whitney-U Test on Comparison of Attitudes (Post-test) of the Students in Experiment-2 Group and Control Group

Attitude Dimensions	Post-test	N	Mean Rank	Sum of Rank	U	P	Significance
General attitudes related to PM courses	Experiment-2 (SEA)	17	19.82	337.00	105.000	0.171	P>0.05
	Control (TE)		15.18	258.00			
Attitudes related to the lecture strategies of PM courses	Experiment-2 (SEA)	17	23.76	404.00	38.000	0.000	P<0.001*
	Control (TE)		11.24	191.00			
Attitudes related to the students' responsibility in the PM course	Experiment-2 (SEA)	17	20.03	340.50	101.500	0.132	P>0.05
	Control (TE)		14.97	254.50			
Attitudes toward students' willingness against PM courses	Experiment-2 (SEA)	17	22.38	380.50	61.500	0.000	P<0.001*
	Control (TE)		12.62	214.50			
Attitudes towards using tools and supplementary materials	Experiment-2 (SEA)	17	19.53	332.00	110.000	0.226	P>0.05
	Control (TE)		15.47	263.00			
Attitudes regarding friendship relations between students	Experiment-2 (SEA)	17	17.09	290.50	137.500	0.796	P>0.05
	Control (TE)		17.91	304.50			
Attitudes regarding lecturer	Experiment-2 (SEA)	17	23.38	397.50	44.500	0.000	P<0.001*
	Control (TE)		11.62	197.50			
Overall Attitude Score	Experiment-2 (SEA)	17	24.56	417.50	24.500	0.000	P<0.001*
	Control (TE)		10.44	177.50			

Table 3 reveals that the Experiment-2 group's overall attitudes post-tests scores were significantly different from the scores of the Control group. The Mann Whitney-U Test revealed in terms of overall attitude, the difference was found significant at the level of α=0.001 among the groups. When attitude scores of Experiment-2 group and Control group were examined according to attitude sub-dimensions, statistically no significant difference at P<0.05 level was found even though it seemed that there was a difference in the Mean Rank

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in attitudes related to PM courses, attitudes related to the students' responsibility in the PM course, towards using tools and supplementary materials and attitudes regarding friendship relations between students. The difference between the groups is found at P<0.001 level in the attitudes related to the lecture strategies of Pattern-Making courses, attitudes toward students' willingness against Pattern-Making courses and attitudes regarding lecturer scores. This means when the Mean Rank values are examined, it is seen that this difference is due to the fact that the attitude scores of the Experiment-2 (SEA) group are more positive than the scores of the Control (TE) group.

Mann Whitney-U Test was conducted to compare two independent groups in order to test the sub-hypothesis of "The attitudes of the students in Experiment-1 group participating in the FFT (post-test) are more positive than the attitudes of the students in the Experiment-2 group participating in the SEA". The results are given in Table 4.

Table 4. The Results of Mann Whitney-U Test on the Comparison of Attitudes (Post-test) of the Students in Experiment-1 and Experiment-2 Groups

Attitude Dimensions	Post-test	N	Mean Rank	Sum of Rank	U	P	Significance
General attitudes related to PM courses	Experiment-1 (FFT)	17	23.88	406.00	36.000	0.000	P<0.001*
	Experiment-2 (SEA)		11.12	189.00			
Attitudes related to the lecture strategies of PM courses	Experiment-1 (FFT)	17	23.47	399.00	43.000	0.000	P<0.001*
	Experiment-2 (SEA)		11.53	196.00			
Attitudes related to the students' responsibility in the PM course	Experiment-1 (FFT)	17	20.59	350.00	92.000	0.067	P>0.05
	Experiment-2 (SEA)		14.41	245.00			
Attitudes toward students' willingness against PM courses	Experiment-1 (FFT)	17	21.62	367.50	74.500	0.015	P<0.05*
	Experiment-2 (SEA)		13.38	227.50			
Attitudes towards using tools and supplementary materials	Experiment-1 (FFT)	17	22.76	387.00	55.000	0.002	P<0.05*
	Experiment-2 (SEA)		12.24	208.00			
Attitudes regarding friendship relations between students	Experiment-1 (FFT)	17	22.65	385.00	57.000	0.002	P<0.05*
	Experiment-2 (SEA)		12.35	210.00			
Attitudes regarding lecturer	Experiment-1 (FFT)	17	22.76	387.00	55.000	0.001	P<0.05*
	Experiment-2 (SEA)		12.24	208.00			
Overall Attitude Score	Experiment-1 (FFT)	17	24.62	418.50	23.500	0.000	P<0.001*
	Experiment-2 (SEA)		10.38	176.50			

According to Table 4, the students in Experiment-1 and Experiment-2 groups were found overall to have significantly different attitude post-test scores. The findings of the Mann

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Whitney-U Test, in terms of overall attitude, the difference among the groups was found to be significant at α=0.001 level.

When Table 4 was analyzed according to attitude sub-dimensions, there was no statistically significant difference in attitudes related to the students' responsibility in the PM course. There are significant differences in attitude scores for all other sub-dimensions. When the mean rank values are examined, it seems that these differences are due to the fact that the attitude scores of the Experiment-1 (FFT) group are more positive than the scores of the Experiment-2 (SEA) group.

As a result of the analysis on the first sub-objective, the attitudes of students increased positively regarding the intervention performed in Experiment-1 group where Smart Board-based Face-to-face Teaching (FFT) was applied, compared to Experiment-2 group where Smart Board-based Synchronous E-learning Application (SEA) was applied. There was a difference between the groups in favor of the Experiment-1 group. Since the Control group did not experience any different teaching approach, no significant change in the attitudes was detected in this group.

6.2. The Effect on Students' Attitudes (pre-test / post-test) of Face-to-face Teaching & Synchronous E-learning Applications Based on Smart Board in Teaching Pattern-Making

The second sub-objective of the study is that the students in the Control and Experiment groups will have a positive and significant increase in the gain scores related to the attitudes of the students in teaching Pattern-Making.

The results of The Wilcoxon Signed-Rank Test on comparison of the attitude gain scores of the students in the Experiment-1 (FFT) group are given in Table 5.

Table 5. The Results of The Wilcoxon Signed-Rank Test on Comparison of the Attitude Gain Scores (Pre-test / Post-test) of the Students in Experiment-1 Group

	Attitude Dimensions	Pre-test / Post-test	N	Mean Rank	Sum of Rank	Z	P	Significance
Experiment-1 / FFT (Face-to-face	General attitudes related to PM courses	Negative Ranks	1	2.50	2.50	-3.504 [a]	0.000	P<0.001*
		Positive Ranks	16	9.41	150.50			
		Equal	0	-	-			
	Attitudes related to the lecture strategies of PM courses	Negative Ranks	0	0.00	0.00	-3.623 [a]	0.000	P<0.001*
		Positive Ranks	17	9.00	153.00			
		Equal	0	-	-			
	Attitudes related to the students' responsibility in the PM course	Negative Ranks	6	4.58	27.50	-1.270 [a]	0.204	P>0.05
		Positive Ranks	7	9.07	63.50			
		Equal	4	-	-			
	Attitudes toward students' willingness against PM courses	Negative Ranks	3	8.50	25.50	-2.209 [a]	0.027	P<0.05*
		Positive Ranks	13	8.50	110.50			
		Equal	1	-	-			

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Attitudes towards using tools and supplementary materials	Negative Ranks	0	0.00	0.00	-3.082 [a]	0.002	P<0.05*
	Positive Ranks	12	6.50	78.00			
	Equal	5	-	-			
Attitudes regarding friendship relations between students	Negative Ranks	4	6.88	27.50	-0.913 [a]	0.361	P>0.05
	Positive Ranks	8	6.31	50.50			
	Equal	5	-	-			
Attitudes regarding lecturer	Negative Ranks	2	2.50	5.00	-3.259 [a]	0.001	P<0.05*
	Positive Ranks	14	9.36	131.00			
	Equal	1	-	-			
Overall Attitude Score	Negative Ranks	1	2.00	2.00	-3.527 [a]	0.000	P<0.001*
	Positive Ranks	16	9.44	151.00			
	Equal	0	-	-			

In Table 5, 16 of the 17 students in Experiment-1 group had higher post-test attitude scores than pre-test attitude scores. When Mean Ranks and Sum of Ranks are taken into consideration and Z values are calculated to determine whether the difference is statistically significant, it is seen that the gain scores for the attitudes of the Experiment-1 group are at the level of α=0.05, z=-3.527.

With regard to attitudes related to PM course, attitudes related to the lecture strategies of PM courses, attitudes toward students' willingness against PM courses, attitudes towards using tools and supplementary materials and attitudes regarding lecturer, the students' attitude scores increased positively. However, there was no significant difference in attitudes related to the students' responsibility in the PM course and regarding friendship relations between students regarding friendship relations between students.

The results of the Wilcoxon Signed-Rank Test on comparison of the attitude gain scores of the students in the Experiment-2 (SEA) group are given in Table 6.

Table 6. The Results of The Wilcoxon Signed-Rank Test on Comparison of the Attitude Gain Scores (Pre-test / Post-test) of the Students in Experiment-2 Group

	Attitude Dimensions	Pre-test / Post-test	N	Mean Rank	Sum of Rank	Z	P	Significance
Experiment-2 / SEA (Synchronous E-learning Applications)	General attitudes related to PM courses	Negative Ranks	6	4.92	29.50	-2.233 [a]	0.026	P<0.05*
		Positive Ranks	11	11.23	123.50			
		Equal	0	-	-			
	Attitudes related to the lecture strategies of PM courses	Negative Ranks	1	2.50	2.50	-3.394 [a]	0.001	P<0.05*
		Positive Ranks	15	8.90	133.50			
		Equal	1	-	-			
	Attitudes related to the students' responsibility in the PM course	Negative Ranks	10	7.80	78.00	-1.027 [b]	0.304	P>0.05
		Positive Ranks	5	8.40	42.00			
		Equal	2	-	-			
	Attitudes toward students' willingness against PM courses	Negative Ranks	7	7.29	51.00	-0.515 [a]	0.606	P>0.05
		Positive Ranks	8	8.63	69.00			
		Equal	2	-	-			

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	Attitudes towards using tools and supplementary materials	Negative Ranks	9	8.06	72.50	-1.261[b]	0.207	P>0.05
		Positive Ranks	5	6.50	32.50			
		Equal	3	-	-			
	Attitudes regarding friendship relations between students	Negative Ranks	11	6.09	67.00	-2.209[b]	0,027	P<0.05*
		Positive Ranks	1	11.00	11.00			
		Equal	5	-	-			
	Attitudes regarding lecturer	Negative Ranks	3	2.00	6.00	-3,342[a]	0.001	P<0.05*
		Positive Ranks	14	10.50	147.00			
		Equal	0	-	-			
	Overall Attitude Score	Negative Ranks	4	4.00	16.00	-2.866[a]	0.004	P<0.05*
		Positive Ranks	13	10.54	137.00			
		Equal	0	-	-			

Table 6 shows that the post-test attitude scores of 13 students in Experiment-2 group are higher than pre-test attitude scores, where the gain scores for the attitudes of the students in Experiment-2 group are at the level of α=0.05, z=-2.866. When the Mean Rank and the totals of the points are taken into account and the Z values are calculated in terms of significance. That is, as a result of the Smart Board-based synchronous E-learning application, it can be said that the attitudes of the students have changed positively.

A positive increase in attitude post-tests scores towards overall attitudes related to PM courses and its lecture strategies was observed. There is no significant difference in the attitudes towards using tools and supplementary materials, attitudes toward students' willingness against PM courses, attitudes related to the students' responsibility in the PM course and attitudes regarding lecturer. In attitudes regarding friendship relations between students, there is a difference in the negative direction. This was not surprising as for this teaching approach the students in Experiment-2 group were not together in the class environment.

The results of The Wilcoxon Signed-Rank Test on comparison of the attitude gain scores of the students in the Control (TE) group are given in Table 7.

Table 7. The Results of The Wilcoxon Signed-Rank Test on Comparison of the Attitude Gain Scores (Pre-test / Post-test) of the Students Control Group

	Attitude Dimensions	Pre-test / Post-test	N	Mean Rank	Sum of Rank	Z	P	Significance
Control / TE (Traditional Education)	General attitudes related to PM courses	Negative Ranks	9	9.67	87.00	-0.984[b]	0.325	P>0.05
		Positive Ranks	7	7.00	49.00			
		Equal	1	-	-			
	Attitudes related to the lecture strategies of PM courses	Negative Ranks	10	10.45	104.50	-1.331[b]	0.183	P>0.05
			7	6.93	48.50			
			0	-	-			

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	Positive Ranks						
	Equal						
Attitudes related to the students' responsibility in the PM course	Negative Ranks	10	9.40	94.00	-1.944[b]	0.052	P>0.05
	Positive Ranks	5	5.20	26.00			
	Equal	2	-	-			
Attitudes toward students' willingness against PM courses	Negative Ranks	11	8.77	96.50	-2.076[b]	0.038	P<0.05*
	Positive Ranks	4	5.88	23.50			
	Equal	2	-	-			
Attitudes towards using tools and supplementary materials	Negative Ranks	11	7.55	83.00	-1.311[b]	0,190	P>0.05
	Positive Ranks	4	9.25	37.00			
	Equal	2	-	-			
Attitudes regarding friendship relations between students	Negative Ranks	8	6.25	50.00	-0.870[b]	0.384	P>0.05
	Positive Ranks	4	7.00	28.00			
	Equal	5	-	-			
Attitudes regarding lecturer	Negative Ranks	5	5.90	29.50	-1.133[a]	0.257	P>0.05
	Positive Ranks	8	7.69	61.50			
	Equal	4	-	-			
Overall Attitude Score	Negative Ranks	10	9.90	99.00	-1.605[b]	0.109	P>0.05
	Positive Ranks	6	6.17	37.00			
	Equal	1	-	-			

In Table 7, the overall attitude scores of only 6 students in the Control group seem to have increased positively. When the Mean Rank and the totals of the scores and Z values are calculated, no significant difference in the attitude gain scores of the students in the control group was found (P>0.05; z=-1.605). A difference was detected only in the attitudes toward students' willingness against PM courses. In all the other sub-dimensions, there is no significant difference at α= 0.05 level.

As a result of the analysis on the second sub-objective, the changes observed regarding the attitudes of the students attending the Pattern-Making teaching can be attributed to the teaching practices applied in the Experiment-1 and Experiment-2 groups. That is, it can be said that there is a positive change in the attitudes of the students as a result of the Smart Board-based Face-to-face Teaching and the Smart Board-based Synchronous E-learning application.

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For the Control group, it was already expected that there would be no change in attitudes as the traditional teaching approach was used.

7. Conclusion

The attitudes related to Pattern-Making teaching of the students in the experimental groups in which Smart Board-based teaching was applied were more positive than the attitudes of the students in the Control group. The attitudes of the students in Experiment-1 in which Smart Board-based Face-to-face Teaching was applied were found to be more positive than the attitudes of students in Experiment-2 group in which Synchronous E-learning Applications was conducted. There was no significant difference in the attitudes of the students in the Control group. Since the course was taught by traditional methods, it was expected that there would be no change in attitudes since in the control group, there is no difference in the teaching process, lecture strategies and course materials.

The traditional teaching of Pattern-Making courses, which is one of the important and basic courses of clothing education, are boring and monotonous. Therefore, students' attitudes towards the course are often not very positive. The results of this research are important to see that student attitudes can be made more positive in skill-based practical courses such as Pattern-making with the use of smart board.

With the use of smart board, courses become more interesting and entertaining. The teacher is able to draw the attention of the students more easily. The handling of the course is free from monotony. Students are actively involved in the learning process. As a result, learners grasp the content more easily, and with reinforcement activities, permanent learning can occur. Competitions and such activities on smart board help the students interact with their classmates and they develop a good relationship with each other. As the lessons are recorded, students can review the classes as many times as they want and achieve thier learning goals. When all these advantages of smart board are considered, it is inevitable that the attitudes of students will change positively when the smart board is used in Pattern-Making courses. As a matter of fact, in the present research results, the attitudes of the students in the experimental groups in which smart board-based teaching practices were conducted, were found to be more positive than the attitudes of the students in the control group. There are studies showing that students develop positive attitudes in English, Science, Mathematics, Biology etc. with the use of smart board (Deniz & Tezer, 2009; Elaziz, 2008; Sayir, 2014; Tercan, 2012; Yapıcı & Karakoyun, 2016). This study’s results also concur with those of the studies mentioned because the students developed positive attitudes towards using the smart board for Face-to-face Teaching and Synchronous E-learning Applications.

8. Implications

According to the results of this research, the boring and monotone pattern-making lessons in clothing education will become more fun and attractive by the use of smart boards in vocational high schools and universities. Hence, because students' attitudes will be more positive in the pattern-making courses, they will probably be more successful with the use of smart board.

On the other hand, although the same teaching techniques and materials were used in both groups, the attitudes of the group where face to face teaching was done were found to be more positive than the attitudes of the e-learning group. This can be explained by the fact that the e-learning group was not in the classroom environment, thus, there was not much change in the attitudes towards the use of tools and friendship relations.

This study has revealed that the use of smart board in e-learning applications enhances students' attitudes to the learnign process. For this reason, smart boards should be incorporated in teaching approches in the pattern making teaching to otimise the students' learning experiences.

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